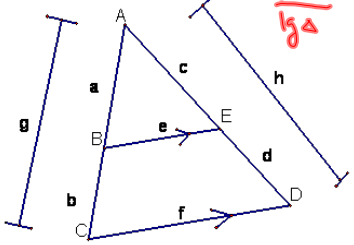
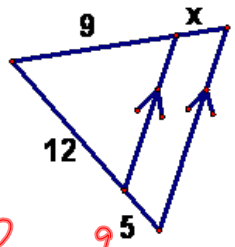
6.6 Using Proportionality Theorems

Theorem 6.4-Triangle Proportionality Theorem-If a line is parallel to one side of a triangle and intersects the other two sides, then it divides the two sides proportionally.



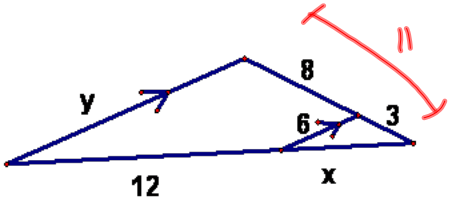
$\frac{a}{g} = \frac{e}{f} = \frac{c}{h}$

$\frac{a}{b} = \frac{c}{d}$



$\frac{12}{5} = \frac{9}{x}$

$x = 3.75$



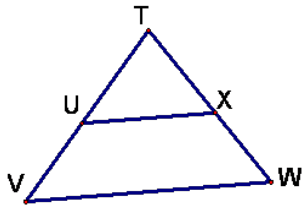
$\frac{x}{12} = \frac{3}{8}$ $\frac{y}{6} = \frac{11}{3}$

$x = 4.5$

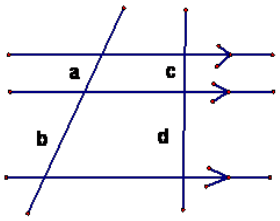
Theorem 6.5-Converse of the triangle proportionality Theorem-
If a line intersects two sides of a triangle proportionally, then the line is parallel to the third side.

If $\frac{TU}{UV} = \frac{TX}{XW}$

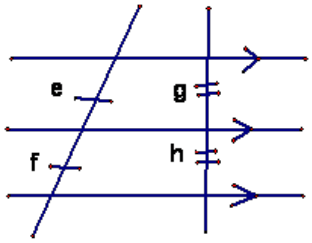
then $\overline{UX} \parallel \overline{VW}$

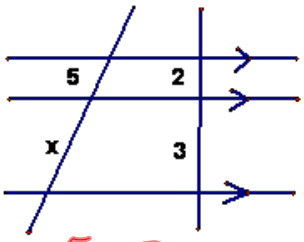


Theorem 6.6-If three or more parallel lines intersect two transversals,
then they divide the transversals proportionally



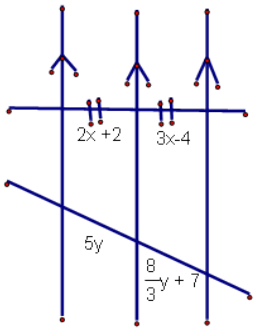
$\frac{a}{b} = \frac{c}{d}$





$\frac{5}{x} = \frac{2}{3}$

$x = 7.5$



$2x + 2 = 3x - 4$

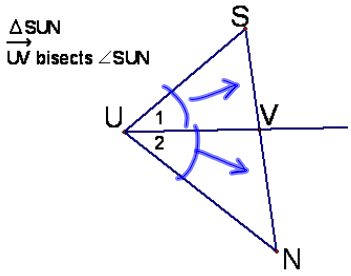
$6 = x$

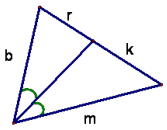
$5y = \frac{8}{3}y + 7$

$y = 3$

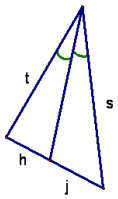
Theorem 6.7-If a ray bisects an angle in a triangle, then it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.

$\frac{SV}{VN} = \frac{SU}{UN}$

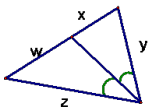




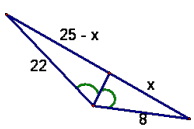
$\frac{r}{k} = \frac{b}{m}$



$\frac{h}{d} = \frac{t}{s}$

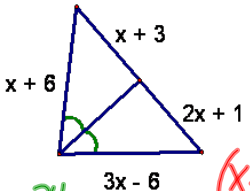


$\frac{w}{x} = \frac{z}{y}$



$\frac{25 - x}{x} = \frac{22}{8}$

$x = 6\frac{2}{3}$



$\frac{x+6}{x+3} = \frac{3x-6}{2x+1}$

$(x+6)(2x+1) = (3x-6)(x+3)$

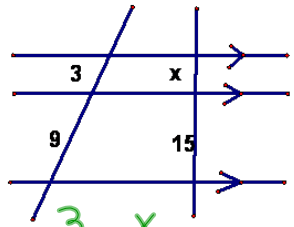
$2x^2 + 13x + 6 = 3x^2 + 3x - 18$

$0 = x^2 - 10x - 24$

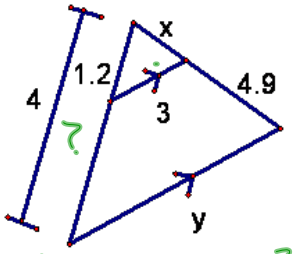
$(x-12)(x+2)$

$x = 12 \quad x = -2$

-24, -12, 2, -10

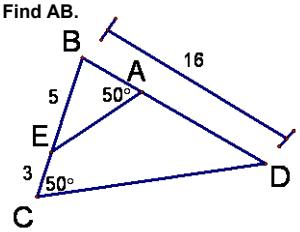


$\frac{3}{9} = \frac{x}{15}$



$\frac{x}{4.9} = \frac{1.2}{2.8}$ $\frac{3}{4} = \frac{1.2}{4}$

Find AB.



$\triangle ABE \sim \triangle CBD$

$\frac{AB}{CB} = \frac{BE}{BD}$

$\frac{x}{8} = \frac{5}{16}$ $x = 2.5$

HW p400-401 #s 3-11, 16